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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,383	08/23/2006	Hiroshi Hasegawa	060619	6985

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EXAMINER	
DAVIS, MARY ALICE	
ART UNIT	**PAPER NUMBER**
3748	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/590,383	HASEGAWA ET AL.	
	Examiner	Art Unit	
	MARY A. DAVIS	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 24-39 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 24 has been amended to include the limitation directed to "said differential pressure regulating valve is opened when the discharge stroke is completed". This limitation is not supported in the disclosure. On Page 17, lines 1-5 "If the pressure in the working chamber 12 rises to a value equal to the pressure in the discharge space 20, the differential pressure regulating valve 21 is opened, and the discharge stroke is **started** (emphasis added)". The claim limitation currently presented contradicts the disclosure as detailed above, and therefore, is considered new matter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24-26 and 28-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over HATTORI ET AL (U.S. Patent 5,775,883) in view of HASEGAWA ET AL (World Intellectual Organization Publication Number WO 03/089766 A1) (English patent family U.S. Patent Publication US 2005/0158199 A1).

Regarding claim 24, HATTORI ET AL discloses:

- An expander comprising a cylinder (13, 15), a shaft (19) having an eccentric portion (19c), a roller (31, 33) which is fitted to said eccentric portion (see Figures 1, 8, and 25) and which eccentrically rotates inside said cylinder (see Figures 2-3, 9-10, 24, and 26-27), a closing member ((21) and (17) for cylinder (13), and (17) and (23) for cylinder (15)) for closing both end surfaces of said cylinder (see Figures 1, 8, and 25), a vane (37) for partitioning a space formed by said cylinder (see Figures 2-3, 9-10, 24, and 26-27), said roller and said closing member into two of working chambers (see Figures 1-3, 8-10, and 24-27), a suction hole (49) through which working fluid flows into said working chamber (Column 4, lines 32-41), and a single discharge hole (55) through which the working fluid is discharged from said working chamber into a discharge space (57) (Column 4, lines 51-58).

Regarding claims 30 and 37-39, HATTORI ET AL discloses:

- a shaft of said expander (19) is directly connected to a shaft (63) of a compressor (see Figures 1, 8, and 25; Column 4, lines 61-67).

However, HATTORI ET AL fails to disclose the discharge hole having a differential pressure regulating valve which is operated by a difference between pressure in said working chamber and pressure in said discharge space.

Regarding claim 24, HASEGAWA ET AL teaches:

- said discharge hole (48, 49) is provided with a differential pressure regulating valve (30a, 30b, 51a, 51b, 52a, 52b) which is operated by a difference between pressure in said working chamber and pressure in said discharge space (the valve is shown in Figures 1 and 3 to be between the working chamber (25, 45) and the discharge space (33), see Abstract); and
- wherein said differential pressure regulating valve is closed when the expansion stroke is completed, and said differential pressure regulating valve is opened when the discharge stroke is completed ("said differential pressure regulating valve is closed when the expansion stroke is completed, and said differential pressure regulating valve is opened when the discharge stroke is completed" is considered functional language. The use of the functional language only requires that the apparatus is capable of performing the function, and does not add any specific structural limitations to the apparatus. Since the differential pressure regulating valve is opened when there is a difference in the pressure in the working chamber and the pressure in the discharge space, it is inherent that in an expansion stroke the fluid is expanding and not in contact with the discharge port that contains the differential regulating valve, and therefore, the differential regulating valve is in a closed position, furthermore, when the shaft

rotates during the discharge stroke the working fluid is pushed from the cylinder when the differential pressure produces enough pressure from the discharge space to move and release the fluid from the cylinder, and therefore, it is open at the end of the discharge stroke. Furthermore, "apparatus claims cover what a device *is*, not what a device *does*." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). (See MPEP 2114)).

Regarding claim 25, HASEGAWA ET AL teaches:

- said differential pressure regulating valve is closed when the pressure in said working chamber is lower than the pressure in said discharge space (see Figures 1 and 3, and Abstract).

Regarding claim 26, HASEGAWA ET AL teaches:

- said differential pressure regulating valve is a reed valve (see Figures 1 and 3).

Regarding claims 28 and 31-33, HASEGAWA ET AL teaches:

- fluid which expands from liquid phase or supercritical phase to gas-liquid two-phase is used as the working fluid (see Figure 2) (See U.S. Patent Publication US 2005/0158199 A1, Page 2, ¶0016, and Page 5, ¶0044) (the expanders of HATTORI ET AL and HASEGAWA ET AL are capable of expanding the fluid from one phase to another).

Regarding claims 29 and 34-36, HASEGAWA ET AL teaches:

- the expander is utilized in a heat pump cycle which uses carbon dioxide as the working fluid (See U.S. Patent Publication US 2005/0158199 A1, Page 2,

¶0017) (the expanders of HATTORI ET AL and HASEGAWA ET AL are capable of using carbon dioxide as a working fluid).

It would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have the discharge hole have a differential pressure regulating valve which is operated by a difference between pressure in said working chamber and pressure in said discharge space in the expander of HATTORI ET AL, in order to improve the efficiency of the expander by preventing incomplete expansion losses and overexpansion losses (see Abstract). Furthermore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have a differential pressure regulating valve in the expander of HATTORI ET AL, in order to allow the working fluid to leave the cylinder at a desired pressure. Equally important, using a known technique from HASEGAWA ET AL to improve a similar expander, requires only routine skill in the art and produces predictable results. In addition, known work in one field of endeavor may prompt variations of its use in the same field or different fields based on design incentives where the variations are predictable in the art. Differential pressure regulating valves are known to be used in expanders, as evidence by HASEGAWA ET AL, and therefore, utilizing a known valve connected to a known device would require only routine skill in the art.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified expander of HATTORI ET AL as applied to claim 25 above, and further in view of KOUNO ET AL (U.S. Patent Publication US 2002/0012595).

The modified expander of HATTORI ET AL discloses the claimed invention as discussed above including the differential pressure regulating valve being a reed valve, however, fails to disclose the differential pressure regulating valve having a circular conical valve portion.

KOUNO ET AL teaches a differential pressure regulating valve having a circular conical valve portion (see Figures 2-3).

It would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have the differential pressure regulating valve have a circular conical valve portion instead of being a reed valve in the modified expander of HATTORI ET AL, in order to improve the efficiency (see Figures 11-12). Furthermore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have the differential pressure regulating valve have a circular conical valve portion instead of being a reed valve in the modified expander of HATTORI ET AL, since a simple substitution of one known element for another known element requires only routine skill in the art.

Response to Arguments

Applicant's arguments with respect to claims 24-30 have been considered but are moot in view of the new ground(s) of rejection necessitated by applicant's amendments.

With regards to the 103(a) rejection of claim 1, applicant argues the combination of HATTORI ET AL with HASEGAWA due to the recently amended claim limitation to "a single discharge" and "two working chambers", since HASEGAWA teaches away from a single discharge with two working chambers. HATTORI ET AL discloses a single

discharge and two working chambers as discussed above, however, fails to disclose a discharge valve. HASEGAWA teaches utilizing discharge valves on an expander. Using known techniques to improve similar devices in the same way requires only routine skill in the art. Adding an appropriate discharge valve, in order to prevent reverse flow in an apparatus is well known in the art, as evidence by HASEGAWA. Even though HASEGAWA discloses multiple chambers, one of ordinary skill in the art can utilize the teachings of a discharge valve in the apparatus of HATTORI ET AL, in order to allow flow to discharge properly from the discharge chamber at the desired time and pressure.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARY A. DAVIS whose telephone number is (571)272-9965. The examiner can normally be reached on Monday thru Thursday; 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas E. Denion/
Supervisory Patent Examiner, Art Unit 3748

/Mary A Davis/
Examiner, Art Unit 3748